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BY THE
REV. FREDERICK SMITH,
PRIVATE CHAPLAIN TO CAPTAIN THE HON. ARTHUR
HAY DRUMMOND, CROMLIX.

With the Author's Compliments.

PHILOSOPHICAL SOCIETY OF GLASGOW,
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Some Investigations into Palæolithic Remains in Scotland. By
the Rev. FREDERICK SMITH, Private Chaplain to Captain
the Hon. Arthur Hay Drummond, Cromlix.

[Read before the Society, 30th November, 1898.]

THE common forms of primitive, or palæolithic, fabricated flint weapons and implements are sufficiently well known to need no description here. But, for the sake of clearness, two of the most familiar forms are shown in Plate I.

The investigations of M. de Perthes in the Somme Valley, about the middle of the century, followed at a later date by the work of Sir Joseph Prestwich, Sir John Evans, Sir Charles Lyell, Sir John Lubbock, and others, established beyond doubt that man had existed in France, England, and elsewhere in Northern Europe at a very early age. Similar investigations in Scotland have hitherto not disclosed evidence of his existence in North Britain at the same early age, and, as explanation of the want of success that has attended repeated search, it has been variously advanced (1) that man was dammed out of Scotland by ice during the palæolithic age, and (2) that during that same period the country was submerged.

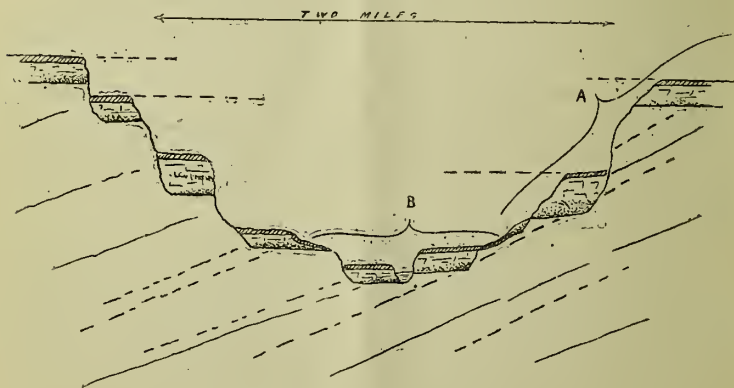
Neither of these explanations seems to be adequate; for (1) during part at least of the period in question (as during the deposition of the *Cyrena fluminalis* beds) the climate of Britain was warmer than it is now, and (2) the geographical occurrence of palæolithic remains in England and France evidence the period to have been that of the *great upheaval* and the denudation of the valleys in which these remains are now found. There can hardly have been so marked an upheaval in England and submergence of Scotland at one and the same time.

A more sufficient explanation is required, and is, I think, to be found in the suggestion that the searchers were looking for the wrong thing. The accepted forms being of flint, flint specimens were sought in Scotland; or, on the supposition that other material than flint might have been used, specimens of equally fine form and elaboration were expected. But no flint exists in

situ in Scotland; hence flint specimens should not have been anticipated. Moreover, no material save flint would accept the work which distinguishes the typical forms; and few Scottish rocks would have retained such work as the flint if it could have accepted it. Accordingly, neither flints nor as highly elaborated specimens of any kind can be expected in Scotland. It must, therefore, be assumed either that (1) palæolithic man was limited in his habitat to the geographical occurrence of flint, or that (2) such specimens as might exist in Scotland would be fashioned of the rocks native to the country, and would be lacking in the peculiar characteristics of flaked flint.

The first assumption has seemed to me to be entirely erroneous, and the second extremely worthy of acceptance. I have, indeed, thought it so worthy of acceptance as to have devoted a great many years to the investigation of its accuracy, with results much more conclusive than I had at first reason to expect.

Circumstances led me many years ago to be deeply interested in the whole question of palæolithic man, and to devote much time to the matter, working principally in East Anglia. When at a later date (1872) I came to Scotland, I resolved to continue in the same line of investigation. I began the search in the lower end of the Earn Valley. But the district was new to me; and, though I lighted upon certain stones whose peculiar shapes attracted my attention, I did not at that time get beyond tentative effort, and, for certain reasons, desisted from further serious attempts for some ten years. In 1883, however, I paid a visit to the Somme Valley, for the purpose of putting to test certain views



SECTION OF SOMME VALLEY.

which I had conceived in Scotland regarding the formation and distribution of river deposits. In the course of this work, which lasted for three months, I was led to further investigate the question of palæolithic remains.

During these investigations in the Somme Valley it became apparent that the contents of the soils were as characteristically evidential of its occupation by palæolithic man as the contents of the implement-bearing gravels. The soils of the higher plateaux and higher shelves on the valley's sides yielded stones in a perfectly angular and presumably fabricated condition in greater abundance than the lower. Indeed, the soils of the lowermost terraces of all contained none of these stones. The results may be tabulated as follows :—

- (1) The geological and geographical occurrence of these stones show that a human agency must have so distributed them.
- (2) These soil stones were totally unrolled by water or other agency.
- (3) They were more bleached upon the higher than upon the lower areas. This factor, with that of their commoner occurrence upon the higher areas and a declension in their numbers as the valley's floor is reached, where they cease altogether to occur, points to the occupation of the valley by palæolithic man while its denudation was being effected.
- (4) When it was further observed that the common forms of the soil stones were repeated in considerable numbers in various gravel beds upon the different levels, but which invariably gave evidence of water rolling and gravel staining, it could not but be assumed that some physical parallel connected the contents of the soils and the gravels together—*i.e.*, that the two sets of phenomena were complementary to each other. The accompanying diagrammatic section shows the general occurrence of river gravels on the valley's sides, and the distribution of the presumed palæolithic angular stones in the soils. *A* indicates the occurrence of the soil stones; *B* the area of their total absence.

It is to be concluded, therefore, that (apart from all suggestions from mere form), since these angular stones do not occur in recently

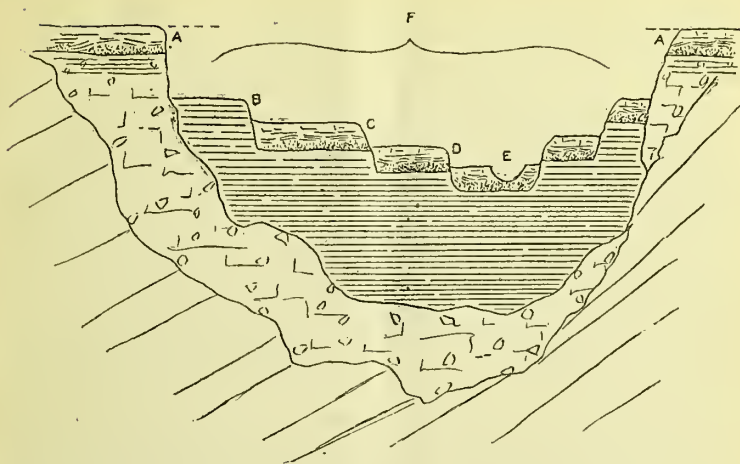
originated soils nor in an unrolled condition in recent deposits, they are not being produced by now acting natural agencies, and were inferentially in the past not produced by natural agencies. Their geographical distribution and geological relations to sub- and surrounding strata force the inevitable conclusion that their occurrence is due to human agency; their forms, too, strongly suggest, and often undoubtedly indicate, artificial fabrication.

Subsequent investigation in the Thames and Cam Valleys, in England, revealed the fact of the geological and geographical occurrence in these areas of the soil stones, and the implement-bearing gravels, in manner exactly comparable with that of the Somme Valley.

On returning to Scotland I set about investigation of the soils, ancient river-deposits, present river-beds, "kaims," and deltas, in the valleys of the Forth, Tay, Earn, Allan, Dee, and Don (Aberdeen), and later the Clyde Estuary. The results were surprisingly similar to those obtained in the Somme Valley and in England, and may be briefly tabulated as follows:—

- (1) Angular—i.e., unrolled—stones, in shape similar to the flints of the Somme, but wanting the characteristic flaking, were found in the soils of the higher areas of the lower Tay Valley, but were entirely absent from those of the 50-feet and lower terraces.
- (2) Similar stones found in Kaims and the most ancient river deposits, but more or less rolled or water-worn.
- (3) These stones entirely absent, under ordinary circumstances, in recent river-deposits; if present, so completely water-worn as to be practically unrecognisable.
- (4) Immediately after a heavy flood, in places where large quantities of ancient gravel have been washed down into the present river-bed, these stones may be discovered, and in a fairly fresh and unrolled condition, but obviously derived from ancient material freshly brought down.

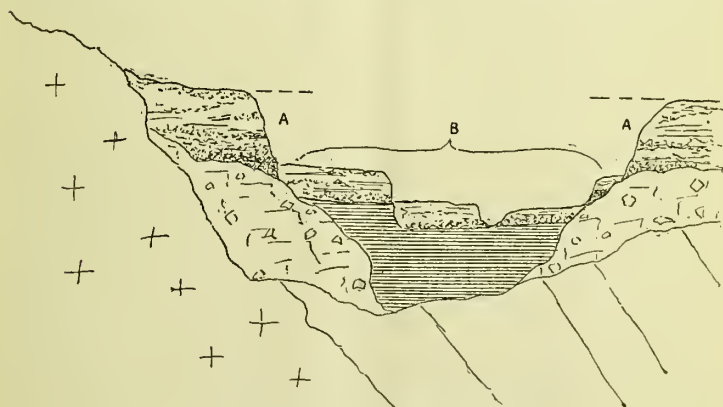
As in the case of the Somme Valley, these stones are not found in an angular or freshly made condition in present river deposits; nature is not now producing them. Again, therefore, the conclusion is inevitable that she did not produce them in past ages, but that the specimens found in the soils and ancient deposits of Scotland are the veritable handiwork of palæolithic man.



SECTION ACROSS TAY VALLEY.

A A.—100-feet terrace. B, C, D.—50, 40, and 30-feet terraces. E.—Present River Tay. Upon and above the level of areas A A the angular soil stones may be found. No such stones occur in the soils of the area under bracket F. Distance across valley by the broken lines, two miles.

The accompanying diagram of a section of the May Valley (Strathearn) illustrates the source of more or less angular and elaborated stones, which I claim to be of human fabrication:—



SECTION OF MAY VALLEY.

A.—High terrace (probably portion of ancient delta), in the material of which little rolled weapons and fabricated stones have been found.
B.—Recent deposits and present bed of the May in which similar forms highly rolled may be discovered.

The accompanying reproductions of a few of these stones exhibit the general typical shapes. They exhibit parallels in weapon and implement with those of the south in every attribute save that of material, and the consequent absence of the dilettante work, so characteristic of the flints. In general style and form they are the same—battle-axe, chopper, knife; all are as characteristically artificial, so far as the material allows, as the typical flint specimens. And when one knows what to look for, and where and how to look, these may be found as readily in certain areas in Scotland as the corresponding flints in England or France. The more abraded and generally weathered or water-worn character of the Scotch specimens is due to the nature of the material—the only material on which our palæolithic forefathers could exert their skill.

I have found such palæolithic weapons and implements in many widely separated areas in Scotland. In those of the Tay, Forth, Clyde, the Dee and Don (Aberdeen), and in places along our coast-line. Among them will be found excellent copies of even the typical forms—the hachés of M. de Perthes' collection. There will be found many stones which have not only been artificially shaped, but whose surfaces (one or more) have been rubbed smooth, and even polished, in the operations (whatever they were) for which they had been elaborated. Some are merely split or faceted pebbles, whose surfaces have been used for some operative grinding purposes; others are hollow-ground and suggest whetstones; others, as though in illustration of the use of the foregoing, were probably knives and choppers, whose cutting-edges had been produced and maintained by grinding. These, with arrowhead and spear-tip, have been found not only in the soils but in ancient deposits which carry us straight back to the glacial period, and, indeed, I have reason to believe, actually into the glacial period itself.

As regards specimens found on the margin of the Clyde Estuary, they have probably, during storm, been lifted or floated up by seaweed from the floor of the estuary—the great hunting ground of palæolithic man during the period of the “great upheaval.” Countless numbers of stones are at times thus brought ashore, some of which are surprisingly little marine-worn.

Some Data.

(a) Regarding the weapons, they not only exhibit the correct typical forms, but invariably show well-defined *cutting edges*, the

pointed end, and the *broad and heavy butt*. And notwithstanding the great abrasion they have suffered in Scotland, and their more easily abradable and decomposable nature, when placed alongside good typical flint specimens they compare well with them.

(*b*) In cases where these weapons (or domestic implements) have been more recently broken, as is often the case, the recent breaks, easily recognisable, have only to be restored to produce the proper typical forms.

(*c*) If found in a comparatively perfect and fresh-looking state, it is invariably in some *ancient* deposit; never in a river bed or recently constructed stratum. The more they have come into the hands of now operating physical agencies the less recognisable has their likeness to the typical forms become.

(*d*) The characteristic forms of these stones did not come about through, and by, a series of accidents—the more perfect the weapon the more striking is the evidence that it received its present, and often complicated, form in one item of time in a remote past.

(*e*) In the case of the more domestic implements (and sometimes in that of the weapons), the old stones or pebbles from which they have been elaborated are often shown by some part of the more ancient surfaces being retained; and then it is seen that these same stones were for unreckoned ages rolled and rounded, and sometimes externally chemically decomposed masses, before they, in some one item of time, assumed their present forms.

(*f*) A weapon may be broken, smashed, say, at its point end, yet we cannot say it was necessarily broken in use. But if we find examples shaped presumably to be held in the hand, and if we find such an example to exhibit evidence of a use which could not be given to it by any known natural agent, but would naturally have been given to it by a grinding use of a human hand; or

(*g*) If we find knife-like examples which show that they have been broken from some ancient and highly-rolled pebbles, also exhibiting ground surfaces, such as would have kept the edges of those knife-like stones sharp; or

(*h*) If we find chopper-like masses, whose forms alone imply a human intention, with artificially sharpened edges in a more or

less hacked condition, we have surely something very nearly akin to proof that unity of form and condition is the result of unity of cause, since there is only one agent conceivable which could have produced such results—and *that agent is man.*

DESCRIPTIONS OF PLATES OF SCOTTISH PALÆOLITHIC WEAPONS AND IMPLEMENTS.

PLATE II.— $\frac{3}{8}$ NAT.

Three Hachés, more or less water-worn—

- (1) From coarse gravel in the high terrace (*A* in section of the May Valley). It is of close-grained basalt.
- (2) From “kame,” or raised delta, Musselburgh, of compact porphyritic rock; an excellent, though highly-rolled specimen.
- (3) From the shore at Troon—of black basalt, more affected and eaten into by chemical action than by rolling or weathering. Washed up from sea bottom.

PLATE III.— $\frac{3}{8}$ NAT.

Three specimens, which compare well with certain of the typical Somme Valley forms—

- (1) A specimen, which, though highly rolled, still shows excellent design and workmanship; its point-end, cutting edges, and indeed the whole form are cleverly produced. It is of a heavy silicious quartzite, with bedding lines horizontal to its length. It was found on the shore near Ayr.
- (2) A good specimen from ancient river bed 50 feet above the present River Earn at Crieff. Of a heavy, compact, volcanic breccia. Very slightly rolled.
- (3) Highly-rolled, but fine specimen of finely laminated, close-grained schistose rock, with bedding on edge and parallel to the length—hence the recent partial loss of the cutting edge, suggested by the dotted lines. From ancient gravel deposit 60 feet above present river bed at Dunblane.

PLATE IV.— $\frac{2}{3}$ NAT.

These are implements of domestic use rather than weapons; have all been artificially shaped, and all, save one, have been smoothed or ground upon one or more surfaces—

- (1) and (2) knife- or chopper- like, which still show ground surfaces at (*a*) and (*b*). (2) has also been ground on the under side. (1) is from the shore at Prestwick; (2) from the kame, or ancient delta, at Musselburgh (whence also the weapon (2) in Plate II.), as also (3) on this Plate, which is probably a “mullar” or grinding-stone. It has been shaped for the hand, and is highly ground on the surface shown at (*c*).

(4) is a split stone, whose surface is hollow ground. Presumably a whetstone for the sharpening of such implements as (1) and (2), or a mill on which such a stone as (3) could have been used. From kame-like deposit at Cromlix.

(5) and (6) are from a remarkable set of almost mathematically-shaped and faceted stones, which are often rubbed or ground upon one or more surfaces. They occur in the high terrace, 60 feet above the Allan at Dunblane, and about 150 feet above sea-level.

These stones (weapons and implements) can only be fully appreciated by being handled. The photographs, without side and other views, do not do them justice. They are taken from a considerable number (some 200 weapons and implements were exhibited when the lecture was delivered), but illustrations must be limited. The author will, however, be happy to place his collection for inspection before any who are sufficiently interested to intimate a proposed visit to The Limes, Dunblane.

Notes.—It is but just to refer to a paper by the late William Gemmell, Esq., M.B., C.M., entitled “On the Discovery of late Glacial Implements in the Rhins of Galloway.” See *Proceedings of the Royal Physical Society of Edinburgh* for Session 1882-83.

For several former papers by the author, see *Scottish Antiquary*, Vol. VIII., p. 147; IX., pp. 131, 167; and X., p. 82.

For abstract of paper read before Section H. British Association, Edinburgh, 1892, see “Report,” p. 896.



PLATE I.



FABRICATED FLINT WEAPONS FROM THE SOMME VALLEY.

PLATE IV.

